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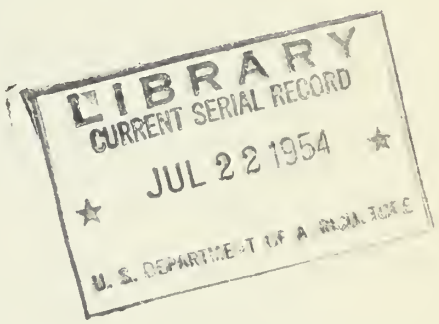


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FOREST SERVICE
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# MIDGE DAMAGE AFFECTS CHRISTMAS-TREE PRODUCTION IN THE INLAND EMPIRE

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Christmas-tree companies operating in northeastern Washington, northern Idaho, and northwestern Montana are greatly concerned over heavy infestations of a dipterous midge (Diptera: Cecidomyiidae) that damage the needles of Douglas-fir. The insect has been identified as Cecidomyia sp. by the Division of Insect Identification, Bureau of Entomology and Plant Quarantine. There are no previous reports available of insects of this genus attacking Pseudotsuga. Although no common name has been assigned to this species, it is referred to locally as the Douglas-fir needle midge. Even though the seasonal history and habits of this insect are not fully known, it seems worthwhile to report on the observations made thus far because of the increasing importance of the pest.

In the northern Rocky Mountains only one generation per year has been found. The appearance of the adults in the spring coincides with the bursting of the buds on Douglas-fir. Oviposition takes place on the new growth, where one or two--but up to four--eggs are inserted into a needle. These hatch into minute larvae, or maggots, which develop in place, feeding upon the juices of the needles. Development is slow, requiring approximately 5 months for the larvae to mature. When full grown they are colorless, or pale yellow, and measure between 1 and 2 millimeters in length (fig. 1).

In October and November the majority of larvae emerge from the needles and drop to the ground to overwinter in the duff. Many of the infested needles break off, allowing the larvae to escape, or tiny, slitlike holes are made through the epidermis. The details of pupation are unknown; however, in dissecting infested needles larvae were found even at the end of December. It is a matter of speculation whether these larvae were unable to escape and were forced to overwinter within the needles, and likewise, whether or not they were able to survive the winter in this manner.

Douglas-fir is the only tree species that has been found infested with the midge in this region. In the early stages of larval development indications of an attack are merely small patches of yellowish discoloration on the needles--similar in appearance to the damage caused by the spruce gall aphid, Chermes cooleyii Gill. Later in the season, however, these necrotic areas are much more visible

Figure 1.--Douglas-fir needles infested by a dipterous midge, showing the larvae and type of work.

(fig. 2). The increase in size of the larvae is accompanied by a slight swelling of the infested portions of the needles, and the areas become straw-colored. In heavy infestations, where practically 100 percent of the new growth has been affected, the tree crown assumes a yellow, sickly appearance.

It is conceivable that heavy populations of this insect over a period of years could cause material damage to Douglas-fir trees in loss of growth. In localized areas reproduction-sized trees have been practically stripped of foliage. Owing to lack of intensive management of Douglas-fir stands, the seriousness of this type of damage is insignificant as yet. In the Christmas-tree business, however, very serious damage has resulted because of disfigurement of the trees. For example, north of Rexford, Montana several thousand acres of Douglas-fir type were made unfit for any harvest in 1952.

Figure 2.--Necrotic area on a Douglas-fir needle caused by a dipterous midge.

It is difficult to even estimate the total monetary damage that has been sustained by the Christmas-tree industry during the present epidemic. In localized areas the economy of entire communities is dependent upon Christmas trees to a considerable extent, and many individuals who have started Christmas-tree farms as businesses are threatened with heavy loss.

Some idea of the economic role of the Douglas-fir needle midge can be gained from data supplied by a large Christmas-tree company operating in this region. In an area including northeastern Washington, northern Idaho, and northwestern Montana up to 100 carloads of trees have been shipped annually in past years by this one company. Eighty-five percent of the shipment is ordinarily made up of Douglas-fir, the preferred species. In 1953 only 37 carloads were shipped,

and this was possible only because about two-thirds of the shipment were comprised of white fir, which was substituted for Douglas-fir. However, some reduction in the total harvest was due also to defoliation by the spruce budworm in Montana.

In terms of number of trees, the loss is far greater than is indicated by using a carload as the unit of output. A carload of Douglas-fir totals from 5,000 to 6,000 trees, whereas a carload of white fir totals from 2,500 to 3,000 trees (i.e., the weight of white fir is twice that of Douglas-fir). In other words, this one company shipped only about 155,000 trees in 1953 as compared with about 500,000 in previous years. Assuming an average value of $1.00 per tree, it is evident that the loss of gross income to the Christmas-tree industry in this region as a whole may easily have exceeded one million dollars in 1953.

It is unfortunate that so little is known about this insect, and possible methods for its control. It can only be hoped that the present outbreak is merely a flare-up of an insect population, such as occurs occasionally, and that its duration will be short-lived. In any event, it would seem that the Douglas-fir needle midge has become a very serious insect pest, and one that is deserving of considerable attention on the part of forest entomologists.